Received: 3 August, 2012
IOTC-2012-WPTmT04-12

Catch/ effort and length-frequency data collected on albacore tuna landed in Mauritius

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ABSTRACT

Albacore tuna (Thunnus alalunga) caught in the Indian Ocean is a commercially valuable species in the tuna longline fishery, especially since 2008, when it was targeted by longliners. Based on logbook data collected and sampling of albacore landed in Mauritius by licensed foreign longliners from 2007 to 2011, the catch/ effort and length-frequency data of albacore has been compiled. As albacore tuna is also caught by local fishing boats, catch/ effort estimates based on samples collected at fish landing stations and final unloading data obtained from the local swordfish fishing operators are also compiled. Catch of albacore tuna by foreign licensed longliners landed in Mauritius has nearly doubled from 1 997 tons in 2007 to 3 580 tons in 2011, with a peak of 4 532 tons in 2010. A decline in fishing activity of the local swordfish fishing fleet was noted which brought along a decline in landings of albacore tuna from 74.4 tons in 2007 to 15.8 tons in 2011. Moreover, some 177 tonnes of albacore tuna are caught annually by the artisanal fishermen operating around anchored Fish Aggregating Devices (AFADs) on boats less than 12 m. During the period under review, a total of 14 472 specimens of albacore were sampled for length frequency. Fork length ranged from 68 cm to 133 cm, with nearly all fish (94%) in the 80-116 cm range, and the mean was 100.1 cm. From 2007 to 2011, more than 50% of the species transhipped in Mauritius consisted of albacore tuna, increasing from 12 182 tons in 2007 to around 20 765 tons in 2011.

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1. Introduction

Mauritius has an Exclusive Economic Zone (EEZ) of approximately 1.9 million km^2 extending from the coasts of the islands of Mauritius, Rodrigues, St Brandon (Cargados Carajos Shoals), Agaléga, Tromelin and the Chagos Archipelago. Figure 1 shows the EEZ of Mauritius in the Indian Ocean.

Fisheries contribute to the national economy to the tune of 1.3% Gross Domestic Product, of which processed tuna for the export market is the main contributor. The majority of the tuna and tuna-like species fishing in the EEZ of Mauritius is carried out by distant water fishing fleets from Europe (purse seiners) and countries of the East and South East Asia (longliners). All vessels licensed to fish in the EEZ of Mauritius are required to land their catch in Port-Louis harbour, and the masters of the vessel are requested to submit duly filled logbooks prior to unloading. Albacore tuna (*Thunnus alalunga*) are caught as target species by foreign longliners and are also caught as bycatch by longliners targeting swordfish (*Xiphias gladius*), and bigeye tuna (*Thunnus obesus*). The proportion of albacore tuna landed by licensed longliners, including Mauritian longliners, in Mauritius, has nearly doubled during the period 2007 (21%) to 2011 (59%).

The local semi-industrial pelagic fishery targeting swordfish also land albacore tuna. The offshore artisanal fishery targets mainly albacore tuna associated with anchored Fish Aggregating Devices (AFADs).

Moreover, a large number of foreign longliners that operate in the South West Indian Ocean region use Port-Louis harbour as a transhipment base making Mauritius a major transhipment centre for tuna. Mauritius has thus developed logistic facilities in Port-Louis harbour, including coldstorage and fish processing facilities. Albacore tuna is the most common species transhipped in Mauritius. The frozen albacore tuna caught by longliners are mainly exported to the Far East countries.

Mauritius, being a member to the Indian Ocean Tuna Commission (IOTC), is committed to providing catch and effort statistical data and information on fishing vessel to the Commission. This paper gives an overall view of the catch and effort data collected on albacore tuna, landed in Mauritius by foreign and local vessels, and transhipment information, from 2007 to 2011. Length-frequency data of albacore tuna caught by foreign longliners for the last five years is also presented.

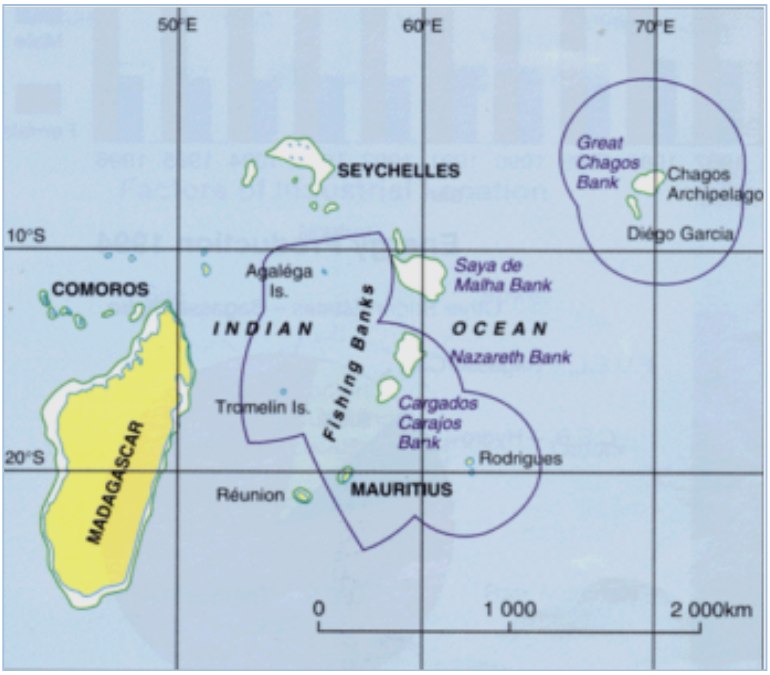


Figure 1. Map showing the EEZ of Mauritius in the Indian Ocean.

2. The Local Pelagic Fishery

2.1. The Fish Aggregating Devices (FAD) Fishery

An artisanal tuna fishery has been developed around anchored FADs (AFADs) in Mauritius since 1985. The AFADs are set at distances from 2-12 nautical miles from the coast and in 2011, 26 FADs were active. There are approximately 380 registered fishermen engaged in the FAD fishery. They use boats 7-8 m in length propelled by outboard motors and the common gear used is handline, trolling and vertical longline.

Catch are landed at 61 prescribed fish landing stations scattered around the island. Sampling at fish landing stations is carried out using the random sample-based data collection system. Data for the artisanal tuna fishery are being collected as from 2008. From 2008 to 2011, the average annual catch from AFADs was 288 tons, with albacore tuna and yellowfin tuna constituting the two main species caught around AFADs (Figure 2). The catch of albacore tuna has remained fairly constant during the period under review with an average of 177 tons per year. However, compared to the other main tunas caught around AFADs, the catch of albacore tuna varied considerably throughout the year, peaking in the summer months, from October to March (Figure 3). The higher catch of albacore tuna compared with the other species is attributed not only to the abundance of albacore tuna during the summer months but also to the fact that fishermen mostly use vertical longline targeting this species, at depth down to 300 m.

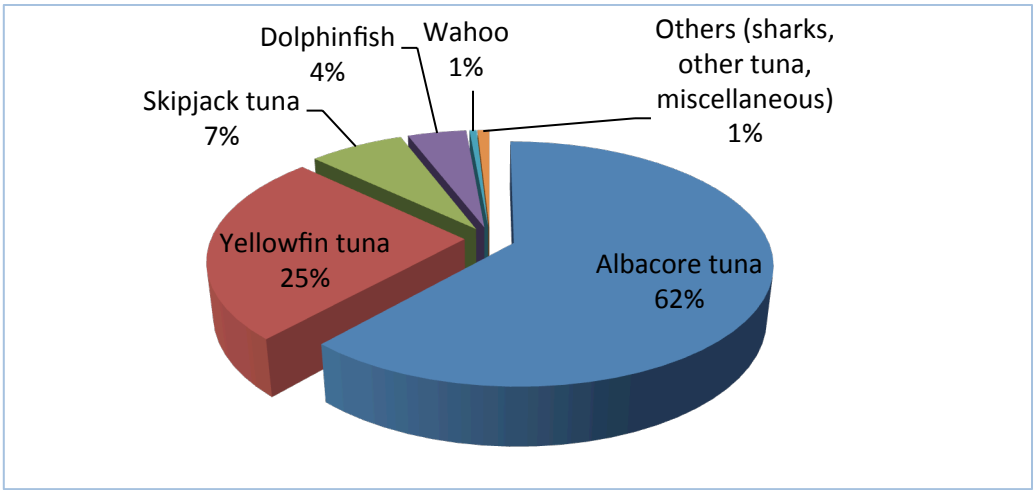


Figure 2. Species composition of catch around AFADs based on 2008 to 2011 data

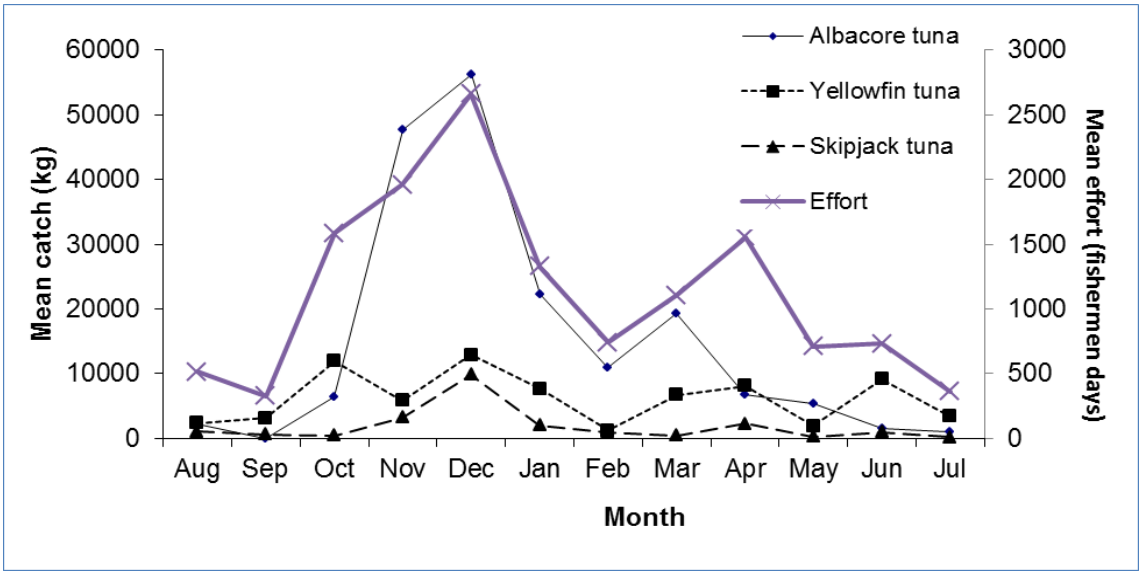


Figure 3. Trend in mean catch of main species caught around AFADs throughout the year based on 2008 to 2011 data

2.2. The local semi-industrial longline fishery

The Mauritian high seas fleet comprises four boats less than 24 m. Mauritius also had four vessels above 24 m operating in this fishery in 2007, out of which two changed flag in 2008. Since 2009, the only vessel with length greater than 24 m was in operation until 2010. Even if the fishery targets swordfish, albacore tuna are frequently caught. Swordfish were mainly sold on the European market and due to a problem in marketing, a decrease in fishing activity was noted which brought along a decline in landings of albacore tuna.

Catch data on the local semi-industrial longline fishery is final unloading data provided by the local fishing operators. 194 trips were carried out by the local fleet during the five-year period under review and details on catch, effort and catch-per-unit-effort (CPUE) of albacore tuna by the local longliners are shown in Table 1.

Year	Catch of albacore tuna (tons)			Number of hooks set			Number of vessels operating and GT range			CPUE (Wt. in kg/ 1000 hooks)
	LOA <24 m	LOA >24 m	Total	LOA <24 m	LOA >24 m	Total	LOA <24 m	LOA >24 m	Total	
2007	56.4	18	74.4	441 645	681 540	1 123 185	6 (GT: 51-99.4)	4 (GT: 315-587)	10	66.2
2008	14.5	3.6	18.1	210 198	465 678	675 876	6 (GT: 49.5-99.4)	2 (GT: 577-597)	8	26.8
2009	0.00	0.05	0.05	0	40 338	40 338	0	1 (GT: 577)	1	1.24
2010	6.17	2.13	8.31	58 500	208 563	267 063	2 (GT: 38.4-42.4)	1 (GT: 577)	3	31.1
2011	15.8	0.00	15.8	252 480	0	252 480	4 (GT: 38.4-99.4)	0	4	62.6

Table 1. Catch, effort and CPUE of albacore tuna by the local fleet (Length Overall (LOA) < 24 m and >24 m) and Gross Tonnage (GT) range of vessels operating, from 2007 to 2011

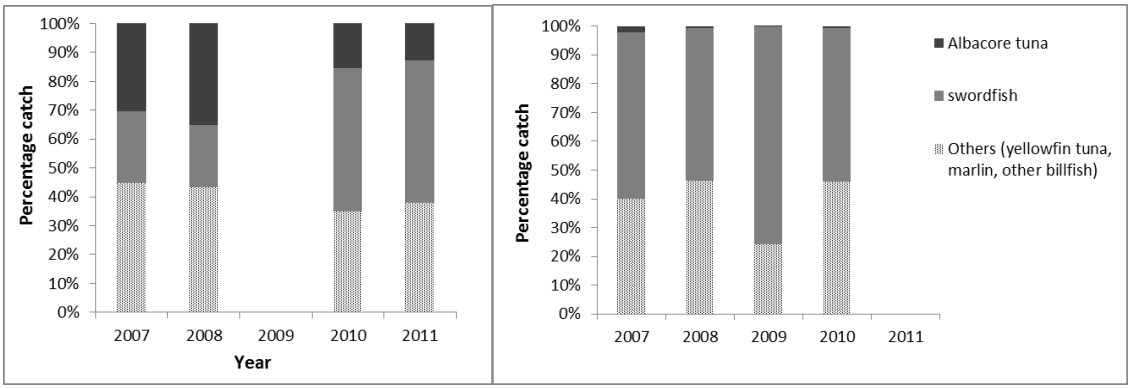


Figure 4. Percentage catch of albacore tuna, swordfish and other species in fleet less than 24 m (left) and greater than 24 m (right) from 2007 to 2011

A larger proportion of albacore tuna is caught by vessels less than 24 m compared to the larger vessels (Figure 4 above). The smaller vessels operate closer to Mauritius due to their restricted capacity to stay long at sea (latitudes 15°-20° S and longitudes 55°-60° E), larger vessels mostly venture further south around latitudes 20°-35° S and longitudes varying from 60° to 90° E. Further studies are required to assess this difference in catches of albacore tuna in vessels less than 24 m and above.

3. Licensed tuna foreign longliners

3.1. Catch, effort and CPUE of albacore by licensed longliners

Mauritius issues licenses to foreign fishing vessels to fish in its EEZ. Some 120 licenses are issued yearly to longliners and purse seiners. Licensed fishing vessels are required to unload their catch in Port-Louis harbour and submit logbooks prior to unloading. The catch/ effort data presented is thus based on logbook information.

A total of 984 logbooks were received from 2007 to 2011. As seen in Figure 5, despite the fluctuations in total catch landed in the last five years, catch of albacore tuna by foreign licensed longliners landed in Mauritius has nearly doubled from 1 997 tons in 2007 to 3 580 tons in 2011, with a peak of 4 532 tons in 2010. The increase in landing of albacore tuna as from 2008 may be attributed to the shift in effort by foreign longline vessels from the Northern Indian Ocean to the Southern Indian Ocean as stated in the IOTC Scientific Committee held last year (IOTC-SC14, 2011).

In 2007, 80% of the licenses were issued to Asian longliners to fish in the EEZ of Mauritius, out of which 69% were targeting albacore tuna. Besides, these fleets also land yellowfin tuna, bigeye tuna, sharks and billfish. The other fleets were targeting species other than albacore tuna explaining the smaller proportion (20%) of albacore tuna in the total catch, earlier in 2007, compared to recent years (Figure 6). For instance, while the Japanese fleet were targeting big eye and yellowfin tunas, the European fleet targeted swordfish. Gradually, the number of licenses issued to Asian longliners increased to 94% in 2011, with all of them targeting albacore tuna. Eventually, fleets that were targeting other species were replaced by those targeting albacore tuna such that in 2011, most albacore tuna was landed as target species (Figure 7). Consequently, around 60% of the catch in 2010 and 2011 consisted of albacore tuna (Figure 6). The peak in albacore tuna landed in 2010 may be explained by the fact that there were 15% more Asian longliners targeting albacore tuna licensed to fish in the Mauritian EEZ during this period compared to 2011.

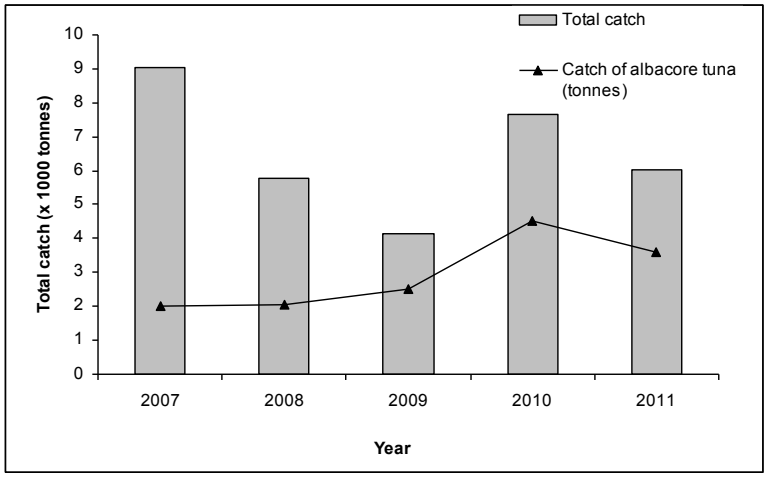


Figure 5. Total catch landed by foreign longliners and catch of albacore tuna from 2007 to 2011

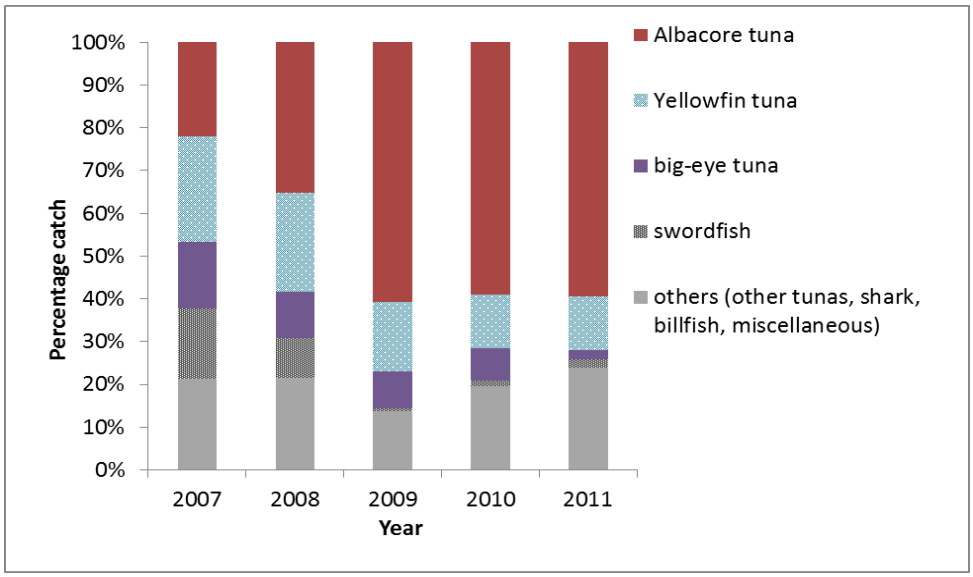


Figure 6. Percentage species composition in the catch of foreign longliners from 2007 to 2011

The CPUE of Asian longliners targeting albacore tuna has a decreasing trend since 2009 even though catch of albacore tuna in 2010 and 2011 are higher compared to the previous years (Figure 7). Despite the low CPUE, effort is increased as from 2008, thereby an increase in catch of albacore tuna (Figure 8).

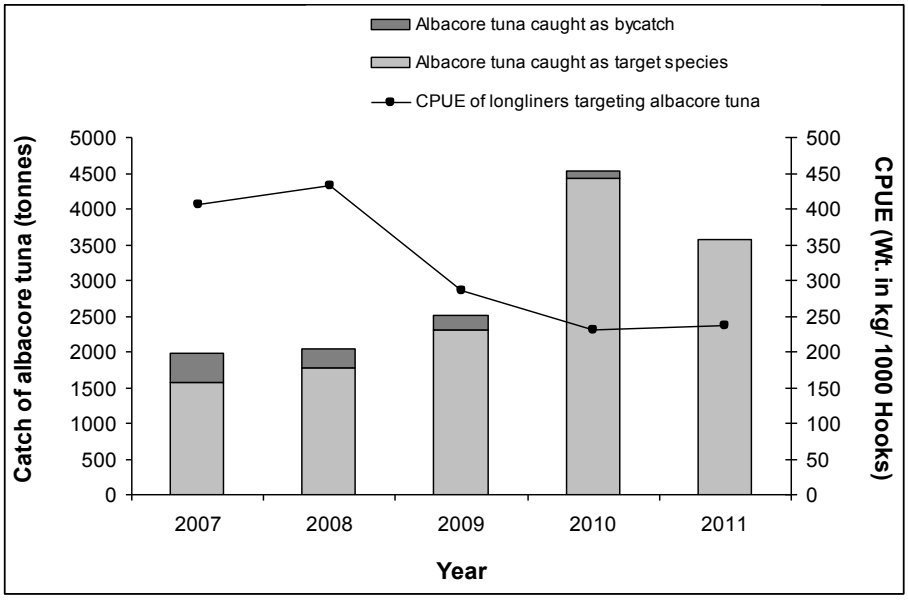


Figure 7. Albacore tuna landed as target species and as bycatch by foreign longliners, and CPUE of longliners targeting albacore tuna from 2007 to 2011

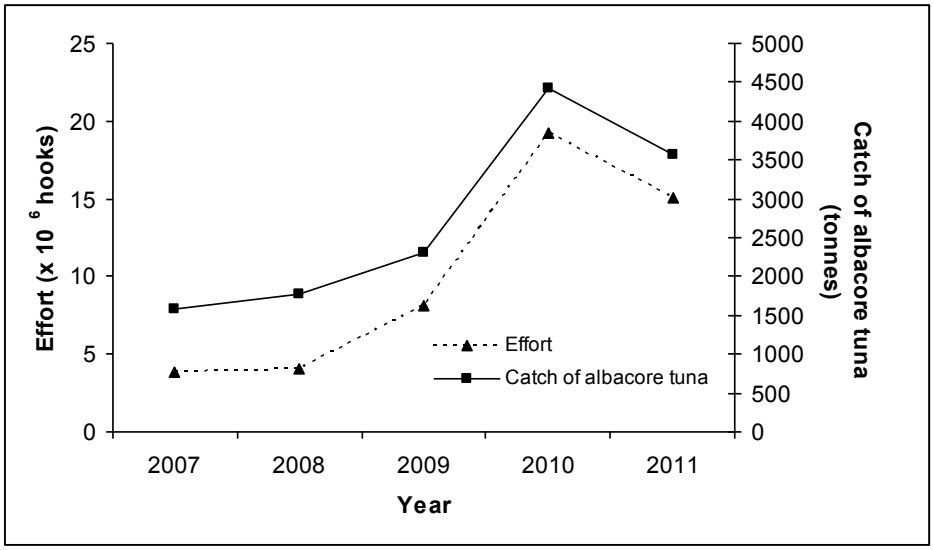
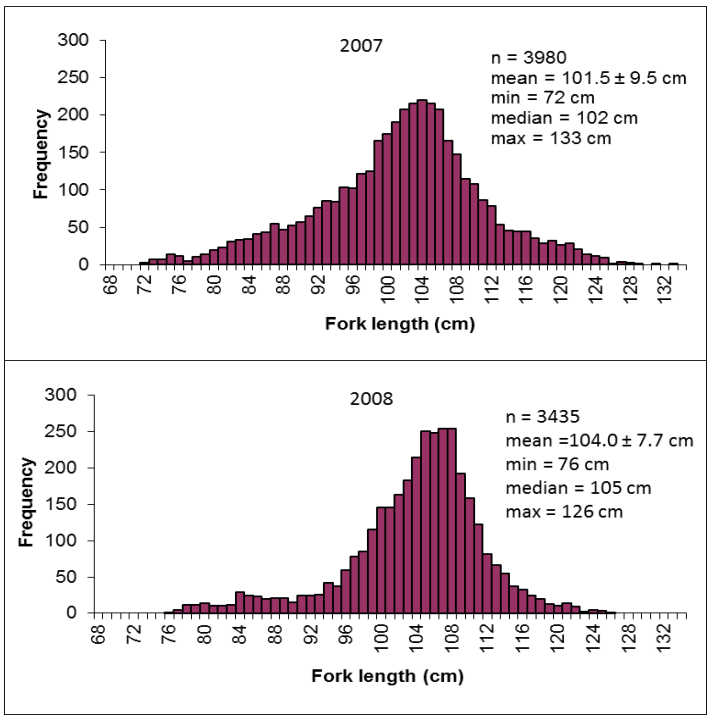


Figure 8. Trend in catch of albacore tuna and effort of foreign longliners targeting the species from 2007 to 2011.

3.2. Length-frequency of albacore tuna

Albacore tuna caught by licensed longliners targeting the species are sampled regularly throughout the year. On average, 250 fish were sampled on a monthly basis from 2007 to 2011. Fish have been sampled monthly from at least 6 vessels selected at random from each unloading. Fork length was measured to the nearest whole cm, rounded up.

During that period, a total of 14 472 fish were sampled. Figure 9 shows the length frequency distributions of albacore tuna, by year, along with the following corresponding parameters: mean length, minimum and maximum lengths and median.



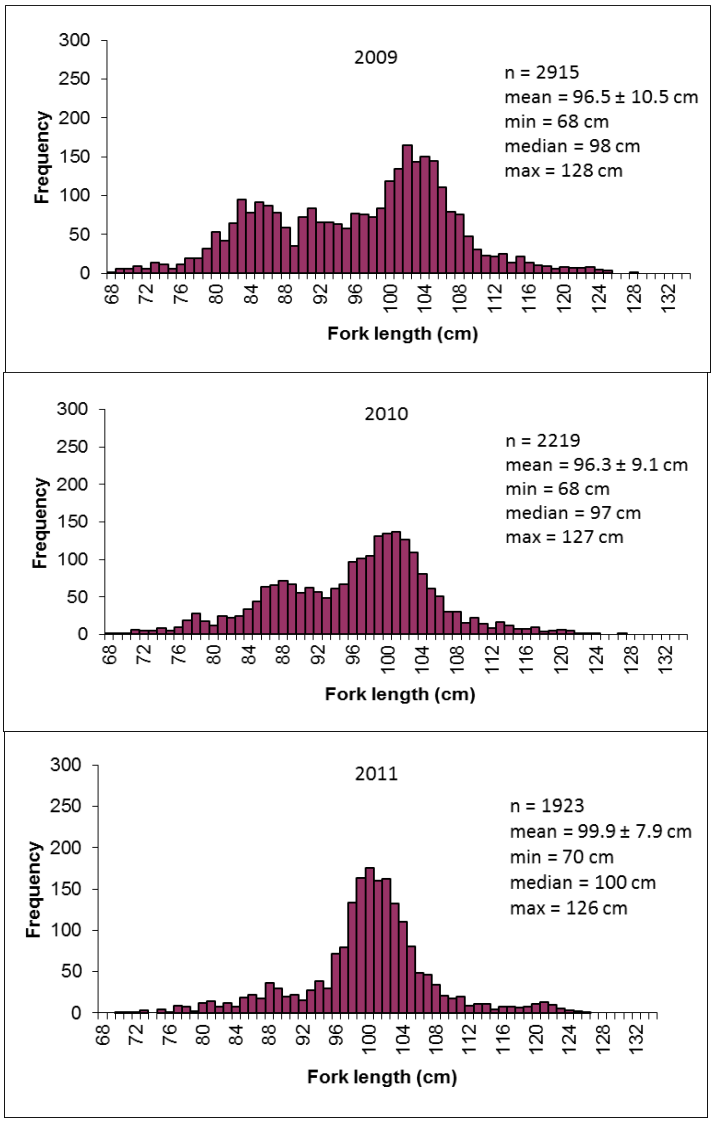


Figure 9. Length frequency distributions of albacore tuna for five years of longline sampling from 2007 to 2011

In this five year period, fork length of albacore ranged from 68 cm to 133 cm, with nearly all fish (94%) in the 80-116 cm range, and the mean was 100.1 cm. The size distribution varies over the years, with more smaller fish (< 90 cm) in 2009 and 2010 and a greater proportion of large fish (>100cm) in 2007 and 2008. However, there were more large fish in 2011 compared to 2009 and 2010. In addition, there were three dominant modes in 2007, 2008 and 2011 with median of 102 cm, 105 cm and 100 cm respectively.

4. Variation in catch by licensed longliners

The catch of albacore tuna is seasonal, rising steadily as from September, as foreign longliners start fishing in the Mauritian waters, and peaks from October to February (Figure 10), similarly to the artisanal FAD fishery. Only few longliners, particularly those not targeting albacore tuna, may operate out of season.

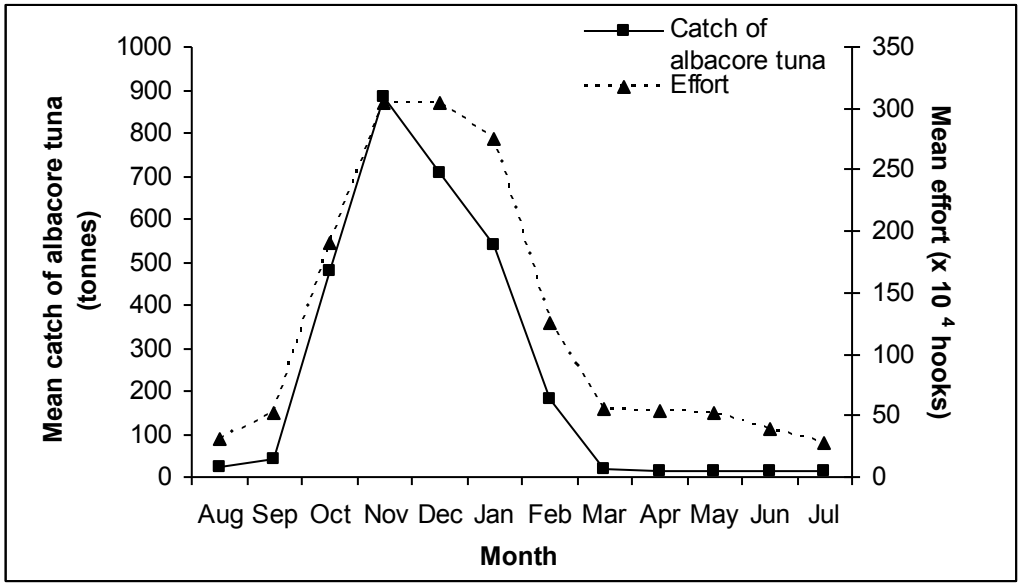


Figure 10. Trend in mean catch of albacore tuna and effort by longliners (foreign and local) throughout the year based on 2007 to 2011 data

The fishing area of licensed longliners is usually widespread in the Western Indian Ocean between latitudes 10° and 35° S and longitudes 40° and 75° E. However, from October to February, catch of albacore tuna was higher in zones between latitudes 10° and 25° S and longitudes 55° to 65° E than other fishing areas.

5. Transhipment of albacore tuna

A total of around 40 043 tons of tuna and tuna-associated species were transhipped at Port-Louis in 2011. From 2007 to 2011, more than 50% of the species transhipped consisted of albacore tuna. Since 2007, transhipment of albacore tuna by licensed and non-licensed longliners in Mauritius has increased from 12 182 tons in 2007 (Fisheries Division, 2009) to around 20 765 tons in 2011 (Figure 11).

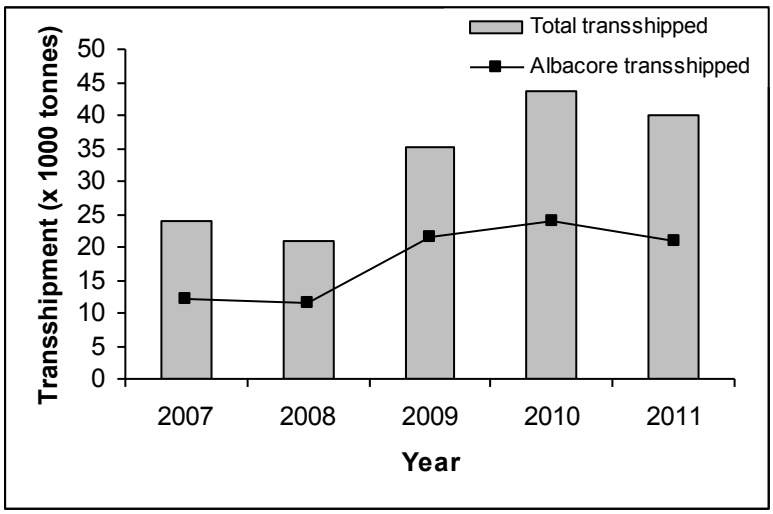


Figure 11. Total species transhipped and trend in transhipment of albacore tuna from 2007 to 2011

Acknowledgements

Thanks to the officers of the Ministry of Fisheries who carried out sampling, fish receiver companies who permitted us to sample fish in their coldroom and to fishermen who cooperated with our sampling requirements.

Thanks to officers S. Soondron, A. Sheik Mamode, D. Kawol and P. Daby for their advice and helpful comments on this paper.

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